AUTOMATIC NUMBER ANNOUNCER AND VERIFICATION CIRCUIT FOR USE WITH AUTOMATIC NUMBER IDENTIFICATION (ANI) ESS (#1, #2 OR #3) X BAR (#1 OR #5) (NS-02503-01)

CONTENTS

1. GENERAL INFORMATION

1.1 Circuit Description

1.11 The Automatic Number Announcer and Verification Circuit (ANAC) is designed to verify central office and station wiring, confirm customer billing and to identify unknown subscriber lines.

1.12 This circuit can be used in Crossbar No. 1, Crossbar No. 5 or Panel offices that use ANI systems, and ESS equipped with TSPS.

2. RECORDS AND REQUIREMENTS

2.1 Records

2.11 The results of these tests should be recorded on forms SD-97-1313 and SD-97-1315. For further information on test records, see Handbook 3, Section 6B.

2.2 Requirements

2.21 The tests of this section are based on NS-02503-01.

3. TEST EQUIPMENT

3.1 Test Sets

Amt	Code	Description
1	ITE-5248	Portable Trunk Test Set

3.2 Accessories

Amt	Code	Description
* 1	ITE-4208A	Hand Set

3.3 Cords

Amt	Code	Description
As Req.	ITE-9140, L-2	Single conductor 1 foot cord terminated with an alligator clip at each end.
As Req.	ITE-9140, L-3	Single conductor 3 foot cord terminated with an alligator clip at each end.
1	ITE-9573	Furnished and used with the ITE-5248 test set.
1	ITE-9621	Furnished and used with the ITE-5248 test set.

* Required only when M, K or J option is provided.

4. SETUP INFORMATION

4.1 Perform the fusing tests outlined in Handbook 59, Section 351 prior to applying this section.

4.2 Perform the Multifrequency Receiver Tests outlined in Handbook 59, Section 352 prior to applying this section.

5. TEST OPERATIONS

5.1 N Option (MD)

5.11 Remove the TM timer from its socket.

5.12 Insert the plug of the ITE-9573 cord in the -48V jack of the ITE-5248. Connect the other end of the cord, clipping the tip lead to -48V and the sleeve lead to ground.

5.13 Insert the plug of the ITE-9621 cord in the TRK jack of the ITE-5248 test set. Connect the other end of the cord, clipping the tip and ring leads to T.S.(A) terminals 36 and 26 respectively.

5.14 If the assigned ANI trunk is connected to the ANAC tip and ring on T.S.(A) terminals 26 and 36, block non-operated relay A of the ANI trunk.

5.15 Apply Table A in the order indicated.

NOTE 1: If the "ST" signal is MF frequencies 10-1 (XA option) a temporary strap must be added from 1B(RRH) to 1M(RR7) for the test to work. The temporary strap must be removed before performing paragraph 5.7.

TABLE A

STEP	OPERATION	OBSERVATION
1	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set ot the NORMAL position.	The S lamp on the ITE-5248 test set flashes on and off before coming on steady Relay SYC1 (Y option) or AS (Z option) operates.
2	Operate and release the KP key on the ITE-5248 test set.	Relay KP operates.
3	Operate and release the 0 key seven times (Z option) or ten times (Y option)	Steering relays SYC1 (Y option) or AS (Z option) through US, with the exception of relay PAS, operate and release in sequence, advancing in step with the operation and release of the 0 key. Relay END operates at the end of the sequence.
4	Operate and release the ST key on the ITE-5248 test set. See Note 1.	The S lamp on the ITE-5248 extinquishes. Relays CD and SYC3 operate.
5	Block operated relays S and P.	The S lamp on the ITE-5248 light.
6	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position.	The S lamp on the ITE-5248 extinquishes.
7	Remove the block from relay P.	The S lamp on the ITE-5248 lights.
8	Remove the block from relay S.	
9	Operate and release the KP key on the ITE-5248 test set.	Relay KP operates.
10	Operate and release the 3 key on the ITE-5248 test set.	Relay AS operates and relay ID2 operates and releases.
11	Operate and release the 0 key on the ITE-5248 test set seven times.	Beginning with the release of relay AS, the steering relays, with the exception of relay PAS, operate and release in sequence, advancing in step with the 0 key on the ITE-5248. Relay END operates at the end of the sequence. Option 9-7DA relay operates.

TABLE A

STEP	OPERATION	OBSERVATION
12	Operate and release the ST key on the ITE- 5248 test set.	Relay TRA operates. Combination high and 60 IPM tone is heard on the ITE-5248 test set with ZQ option. With ZP option relay TMA will have to be oprated to hear high tone.
13	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set and the combination high tone and 60 IPM tone extinquishes.
14	Repeat Steps 1 thru 13 for digits 1 and 2.	Same as Steps 1 thru 13.
15	Repeat Steps 1 thru 9.	Same as Steps 1 thru 9.
16	Operate and release the 1 key on the ITE-5248 test set.	Relays ON and SYC3 release. High tone is heard on the ITE-5248 test set.
17	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set and the high tone extinquishes.
18	Repeat Steps 1 thru 9.	Same as Steps 1 thru 9.
19	Operate and release the 2 key on the ITE-5248 test set.	Relays ON and SYC3 release. 120 IPM tone is heard on the ITE-5248 test set. With YC option high tone will also be heard.
20	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 and the tone(s) extinquish.
21	Repeat Steps 1 thru 10.	Same as Steps 1 thru 10.
21A	Set the "B" thru "U" switches to 111111 respectively (option 10).	
22	Operate and release the 1 key on the ITE-5248 test set.	Relay ROA operates.
23	Operate and release the 1 key on the ITE-5248 test set six times.	The remainder of the steering relays, with the exception of relay PAS, operate nd release in sequence, advancing in step with the operation and release of the 1 key. Relay END operates at the end of the sequence.
24	Operate and release the ST key on the ITE-5248 test set.	Audible ringing is heard from the ITE-5248 test set.
25	Option 10.	"111-1111" is heard on the ITE-5248 test test set. Relay SA operates. Option 8 - The audible readout is repeated.
25A	Momentarily apply ground to TS(A) terminal 37 (Q option) or TS(A), terminal 27 (R option) for NJ02503A; TS(A) terminal 36 (Q option) or TS(A) 26 (R option) for NJ02503B.	"111-1111" is heard on the ITE-5248 test test set. Relay SA operates. Option 8 - The audible readout is repeated.
26	After the last digit is heard in the ITE-5248 test set.	All relays release except relays S, TRS, CD and OFT.

TABLE A

STEP	OPERATION	OBSERVATION
27	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	All relays release.
28	Repeat Steps 21 thru 27 for digits 6 and 7.	Same as Steps 21 thru 27 except "666-6666" and "777-7777" are heard.
29	Repeat Steps 1 thru 10.	Same as Steps 1 thru 10.
29A	Set the "B" thru "U" switches to 3, 4, 5, 8, 9 and 0 respectively option 10.	
30	Operate and release keys 2,3,4,5,8,9 and 0 on the ITE-5248 test set.	
31	Operate and release key ST on the ITE-5248 test set.	Audible ringing is heard on the ITE-5248 test set.
32	Option 10.	"234-5890" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The read out is repeated.
32A	Momentarily apply ground to TS(A) terminal 37 (Q option) or TS(A), terminal 27 (R option) for NJ02503A; TS(A) terminal 36 (Q option) or TS(A) 26 (R option) for NJ02503B.	"234-5890" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The read out is repeated.
33	Replace timer TM.	Relay TMA operates in approximately 3 seconds. Relay TMA1 and P operate in approximately 20 seconds.
34	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	All relays release.
35	Remove the test equipment and restore the circuit to normal.	

5.2 M or K Option

5.21 Remove the TM timer from its socket.

5.22 Insert the plug of the ITE-9573 cord in the -48V jack of the ITE-5248. Connect the other end of the cord, clipping the tip lead to -48V and the sleeve lead to ground.

5.23 Insert the plug of the ITE-9621 cord into the TRK jack of the ITE-5248 test set. Connect the other end of the cord, clipping the tip and ring leads to T.S.(A) terminals 48 and 58 respectively if NJ02503B is provided or T.S.(A) terminals 36 and 26 respectively if NJ02503A unit is provided.

5.24 If the assigned ANI trunk is connected to the ANAC tip and ring terminals, block non-operated relay A of the ANI trunk.

5.25 Apply Table B in the order indicated.

TABLE B

STEP	OPERATION	OBSERVATION
1	Apply ground to T.S.(A) terminal 38 if NJ02503B unit is provided or T.S. (B) terminal 38 if NJ02503A unit is provided.	Relay TEN operates.
2	Perform Steps 1 thru 32 of Table A.	Same as Steps 1 thru 32 of Table A.
3	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	
4	Disconnect ITE-9621 cord tip and ring leads from terminals. Connect tip and ring leads to T.S.(A) terminals 47 and 57 respectively if NJ02503B unit is provided or T.S.(B) terminals 47 and 57 respectively if NJ02503A unit is provided.	
5	Remove ground from T.S.(A) terminal 38 if NJ02503B unit is provided or T.S.(B) terminal 38 if NJ02503A unit is provided.	Relay TEN releases.
6	Apply ground to T.S.(A) terminal 37 if NJ02503B unit is provided or T.S.(B) terminal 37 if NJ02503A unit is provided.	Relay THR operates.
7	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	The S lamp on the ITE-5248 lights and extinquishes twice. Relay SYC3 operates.
8	Block operated relay S.	
9	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position.	The S lamp on the ITE-5248 lights.
10	Remove the block from relay S.	
11	Operate and release KP key on the ITE-5248 test set.	Relay THR1 operates.
12	Operate and release the 3 key on the ITE-5248 test set.	Relay AS operates.
13	Operate and release the 1 key on the ITE-5248 test set seven times.	Beginning with the release of relay AS, the steering relays, with the exception of relay PAS, operate and release in sequence, advancing in step with the 1 key on the ITE-5248. Relay END operates at the end of the sequence.
14	Connect ITE-4208A Hand Set to T.S.(A) terminals 25 and 35 if NJ02503B unit is provided or T.S.(B) terminals 25 and 35 if NJ02503A unit is provided.	Monitor the receiver of ITE-4208A Hand Set when Step 15 is performed.
15	Operate and release the ST key on the ITE-5248 test set.	"111-1111" followed by 120 IPM tone is heard in the ITE-4208A Hand Set. Option 8 - The audible readout is repeated.

TABLE B (Cont'd)

STEP	OPERATION	OBSERVATION
16	Restore the NORMAL-OPEN LOOP-REVERSE key to the OPEN LOOP position.	
17	Insert the TM timer.	
18	Block operated relay S.	Relay TMA operates in approximately 3 seconds.
19	Allow approximately 20 seconds for a time out.	Relay TMA1 operates.
20	Remove all test equipment and restore the circuit to normal.	

5.3 ZB Option (#1ESS-TSPS) (#2ESS-TSPS)

5.31 Remove the TM timer from its socket.

5.32 Insert the plug of the ITE-9573 cord in the -48V jack of the ITE-5248. Connect the other end of the cord as follows: Tip lead to -48V and sleeve lead to ground.

5.33 Insert the plug of the ITE-9621 cord in the TRK jack of the ITE-5248 test set. Connect the other end of the cord as follows: Tip lead to T.S.(A), terminal 48 and ring lead to T.S.(A), terminal 58.

5.34 If the assigned TSPS trunk is connected to the ANAC tip and ring terminals, block non-operated relay C in the TSPS trunk and insulate "C" relay contacts 2B and 3B.

5.35 Apply Table C in the order indicated:

TABLE C

STEP	OPERATION	OBSERVATION
1	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	The S lamp on the ITE-5248 test set flashes on and off before coming on steady. Relays ETN, ETN1 and TEN operate. Relay SYC1 (ZE option) or AS (Z option) operates.
2	Operate and release the KP key on the ITE-5248 test set.	Relay KP operates.
3	Operate and release the 0 key seven times (Z option) or ten times (ZE option).	Steering relays SYC1 (Y option) or AS (Z option) through US, with the exception of relay PAS, operate and release in sequence, advancing in step with the operation and release of the 0 key. Relay END operates at the end of the sequence.
4	Operate and release the ST key on the ITE-5248 test set.	The S lamp on the ITE-5248 extinquishes. Relays CD and SYC3 operate.
5	Block operated relays S and P.	The S lamp on the ITE-5248 light.

TABLE D (Cont'd)

STEP	OPERATION	OBSERVATION
6	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the REVERSE position.	The S lamp on the ITE-5248 extinquishes.
7	Remove the block from relay P.	The S lamp on the ITE-5248 lights.
8	Remove the block from relay S.	
9	Operate and release the KP key on the ITE-5248 test set.	Relay KP operates.
10	Operate and release the 3 key on the ITE-5248 test set.	Relay AS operates and relay ID2 operates and releases.
11	Operate and release the 0 key on the ITE-5248 test set seven times.	Beginning with the release of relay AS, the steering relays, with the exception of relay PAS, operate and release in sequence, advancing in step with the 0 key on the ITE-5248. Relay END operates at the end fo the sequence.
12	Operate and release the ST key on the ITE-5248 test set.	Relay TRA operates. Combination high and 60 IPM tone is heard on the ITE-5248 test set with ZO option. With ZP option relay TMA will have to be operated to hear high tone.
13	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set and the combination high tone and 60 IPM tone extinquishes.
14	Repeat Steps 1 thru 13 for digits 1 and 2.	Same as Steps 1 thru 13.
15	Repeat Steps 1 thru 9.	Same as Steps 1 thru 9.
16	Operate and release the 1 key on the ITE-5248 test set.	Relays ON and SYC3 release. High tone is heard on the ITE-5248 test set.
17	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 test set and the high tone extinquishes.
18	Repeat Steps 1 thru 9.	Same as Steps 1 thru 9.
19	Operate and release the 2 key on the ITE-5248 test set.	Relays ON and SYC3 release. 120 IPM tone is heard on the ITE-5248 test set. With YC option high tone will also be heard.
20	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	The S lamp on the ITE-5248 and the tone(s) extinquish.
21	Repeat Steps 1 thru 10.	Same as Steps 1 thru 10.
21A	Set the "B" thru "U" switches to 1,1,1,1,1,1 respectively (option 10).	
22	Operate and release the 1 key on the ITE-5248 test set.	Relay ROA operates.

TABLE C (Cont'd)

STEP	OPERATION	OBSERVATION
23	Operate and release the 1 key on the ITE-5248 test set six times.	The remainder of the steering relays with the exception of relay PAS, operate and release in sequence, advancing in step with the operation and release of the 1 key. Relay END operates at the end of the sequence.
24	Operate and release the ST key on the ITE-5248 test set.	Audible rining is heard from the ITE-5248 test set.
25	Option 10.	"111-1111" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The audible readout is repeated.
25A	Momentarily apply ground to T.S.(A) terminal 37 (Q option) or T.S.(A) terminal 27 (R option) for NJ02503A. Momentarily apply ground to T.S.(A) terminal 37 (Q option) or T.S.(A) terminal 26 (R option) for NJ02503B.	"111-1111" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The audible readout is repeated.
26	After the last digit is heard in the ITE-5248 test set.	All relays release except relays S, TRS, CD and OFT.
27	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	All relays release.
28	Repeat Steps 21 thru 27 for digits 6 and 7.	Same as Steps 21 thru 27 except "666-6666" and "777-7777" are heard.
29	Repeat Steps 1 thru 10.	Same as Steps 1 thru 10.
29A	Set the "B" thru "U" switches to 3,4,5,8,9,0 respectively (option 10).	
30	Operate and release keys 2,3,4,5,8,9, and 0 on the ITE-5248 test set.	
31	Operate and release key ST on the ITE-5248 test set.	Audible ringing is heard on the ITE-5248 test set.
32	Option 10.	"234-5890" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The audible readout is repeated.
32A	Momentarily apply ground per Step 25.	"234-5890" is heard on the ITE-5248 test set. Relay SA operates. Option 8 - The audible readout is repeated.
33	Restore the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the OPEN LOOP position.	
34	Disconnect ITE-9621 cord tip and ring leads. Connect tip and ring leads to T.S. (A) terminals 47 and 57 respectively.	

TABLE C (Cont'd)

STEP	OPERATION	OBSERVATION
35	Operate the NORMAL-OPEN LOOP-REVERSE key on the ITE-5248 test set to the NORMAL position.	The S lamp on the ITE-5248 test set flashes on and off before coming on steady. Relays ETH, THR and ETH1 operate.
36	Operate and release the KP key.	Relay KP operates.
37	Operate and release the ST key.	Relays D, P1, TRS, and SYC3 operate and S lamp on set extinquishes.
38	Block S relay operated. Operate the NORMAL-OPEN LOOP-REVERSE key to the REVERSE position.	S lamp lights.
39	Remove the block from relay S.	
40	Operate and release KP key on the ITE-5248 test set.	Relay THR1 operates.
41	Operate and release the 3 key on the ITE-5248 test set.	Relay AS operates.
42	Operate and release the 1 key on the ITE-5248 test set seven times.	Beginning with the release of relay AS, the steering relays, with the exception of relay PAS, operate and release in sequence, advancing in step with the 1 key on the ITE-5248. Relay END operates at the end of the sequence.
43	Connect ITE-4208A Hand Set to T.S.(A) terminals 25 and 35.	Monitor the receiver of ITE-4208A Hand Set when Step 44 is performed.
44	Operate and release the ST key on the ITE-5248 test set.	"111-1111" followed by 120 IPM tone is heard in the ITE-4208A Hand Set. Option 8 - The audible readout is repeated.
45	Restore the NORMAL-OPEN LOOP-REVERSE key to the OPEN LOOP position.	
46	Insert the TM timer.	
47	Block operated relay S.	Relay TMA operates in approximately 3 seconds.
48	Allow approximately 20 seconds for a time out.	Relay TMA1 operates.
49	Remove all test equipment and restore the circuit to normal.	

5.4 Figures 5 and 6 (Apparatus)

5.41 Remove the TM timer from its socket.

5.42 Insert the plug of the ITE-9573 cord in the -48V jack of the ITE-5248. Connect the other end of the cord as follows: Tip lead to -48V and sleeve lead to ground.

5.43 Insert the plug of the ITE-9621 cord in the TRK jack of the ITE-5248 test set. Connect the other end of the cord to the tip and ring terminals on T.S.(C), (D) or (E) of NJ02503C unit per Table 1 for first circuit to be tested.

5.44 Apply Table D (Figure 5) or Table E (Figure 6) in the step order indicated.

TABLE 1

App.	Ckt.	Terminal for 10 Digit TS	T	R	S/ON	Terminal for 3 Digit TS	T	R	S/ON
6	1	C	48	58	38	C	47	57	37
6	2	C	46	56	36	C	45	55	35
6	3	C	44	54	34	C	43	53	33
6	4	E	48	58	38	E	47	57	37
6	5	E	46	56	36	E	45	55	35
6	6	E	44	54	34	E	43	53	33
6	7	E	42	52	32	E	41	51	31
5	A	D	48	58	--	D	28	38	--
5	B	D	47	57	--	D	27	37	--

TABLE D (Figure 5)

STEP	OPERATION	OBSERVATION
1	(See Paragraph 5.34.) Operate the NORMAL-OPEN LOOP-REVERSE key on the test set to the NORMAL position. See Note 1.	The S lamp on the test set flashes on and off before coming on steady. Relays ETN-, TEN, S and LTN- operate. Check that relays EMB-, EBY-, SMB- and SBY- are operated for all other circuits and the EBY- relay for this circuit is operated.
2	Perform Steps 2 thru 33 per Table C.	Same as Table C for these steps.
3	Move the tip and ring lead cord to the terminals associated with 3 digit dialing for this circuit.	
4	Operate the NORMAL-OPEN LOOP-REVERSE key on the test set to the NORMAL position.	The S lamp on the test set flashes on and off before coming on steady. Relays ETH-, THR, S and LTM- operate. Check that relays EMB-, EBY-, SMB- and SBY- are operated for all other circuits and the EMB-, relay for this circuit is operated.
5	Perform Steps 36 thru 45 per Table C.	Same as Table C for these steps.
6	Move the tip and ring key to the OPEN LOOP position.	
7	Repeat Steps 1 and 2 as required.	Same as Steps 1 and 2.
8	Restore the test set key to the OPEN LOOP position.	
9	Move the tip and ring lead cord to the terminals associated with 3 digit dialing for this circuit.	
10	Repeat Steps 4 and 5 as required.	Same as Steps 4 and 5.
11	Restore the test set key to the OPEN LOOP position.	

TABLE D (Figure 5)

STEP	OPERATION	OBSERVATION
12	Perform Steps 46 thru 48 per Table C.	Same as Table C for these steps.
13	Remove all test equipment and restore the circuit to normal unless circuits per Figure 6 are included in the shared arrangement.	

NOTE 1: If a complete ANAC circuit test has been performed per Table E, omit Steps 2, 5, and 12 in this table.

TABLE E (Figure 6)

STEP	OPERATION	OBSERVATION
1	(See Paragraph 5.24.) Apply ground to the S (or ON) terminal on T.S.(C) or (E) per Table 1 for circuit to be tested. See Note 1.	Relays STN- and TEN operate. Check that relays EMB-, SMB-, SBY- and EBY- are the SBY- relay for this circuit is operated.
2	Operate the NORMAL-OPEN LOOP-REVERSE key on the test set to the NORMAL position.	The S lamp on the test set flashes on and off before coming on steady.
3	Perform Steps 2 through 33 Table C (change ZE option to read Y option in Step 3).	Same as Table C for these Steps.
4	Remove the ground applied in Step 1.	STN-, TEN and all make busy relays release.
5	Move the tip and ring lead cord to terminals associated with 3 digit dialing for this circuit.	
6	Apply ground to the S (or ON) terminals associated with 3 digit dialing for this circuit. See Table 1.	Relays STH- and THR operate. Check that relays EMB-, SMB-, SBY- and EBY- are operated for all other circuits and the SMB- relay for this circuit is operated.
7	Operate the NORMAL-OPEN LOOP-REVERSE key on the test set to the NORMAL position.	The S lamp on the test set lights and extinquishes twice. Relay SYC3 operate.
8	Perform Steps 8 thru 16 per Table B.	Same as Table B for these Steps.
9	Move the tip and ring lead cord to the terminals associated with the next Figure 6 circuit to be tested. Remove the ground applied to previous circuit.	
10	Repeat Steps 1, 2 and 3 as required.	Same as Steps 1, 2 and 3.
11	Remove the ground applied in Step 10 and restore the test set key to the OPEN LOOP position.	
12	Repeat Steps 5, 6, 7 and 8 as required.	Same as Steps 5, 6, 7 and 8.
13	Restore the test set key to the OPEN LOOP position.	

TABLE E (Figure 6)
(Cont'd)

STEP	OPERATION	OBSERVATION
14	Repeat Steps 9 thru 13 for each equipped Figure 6 circuit.	Same as Steps 9 thru 13.
15	When Step 13 is completed for the last Figure 6 circuit, perform Steps 17 thru 19 per Table B.	Same as Table B for these steps.
16	Remove all test equipment and restore the circuit to NORMAL unless circuits per Figure 5 are included in the shared arrangement.	

NOTE 1: If a complete ANAC circuit test has been performed for Table D, omit Steps 3, 8 and 15 in this Table.

5.5 Figure 7

5.51 Apply steps in Table G in the order indicated for #1 and #5 X-Bar.

5.511 Test ANAC unit using Paragraph 5.2 before applying this test. Table F is only a test of the chain circuit.

TABLE F

STEP	OPERATION	OBSERVATION
1	Remove the TM timer from its socket.	
2	Block operated th THR relay in the first Figure 7 circuit.	Relay CT operates. Observe that the MB relay is operated in all other Figure 7 circuits.
3	Block operated the THR relay and momentarily operate the CT relay in all other Figure 7 circuits.	These CT relays should not lock operated.
4	Release the THR relay blocked operated in Step 3.	
5	Using the ITE-4208A Handset initiate a 10 digit call from the MDF to all of the Figure 7 circuits.	All 10 digit calls, except for the circuit under test, should be completed.
6	Using the ITE-4208A Handset initiate a 3 digit call from the MDF to all Figure 7 circuits except the one under test.	All circuits should indicate a busy condition.
7	Release the THR relay in Step 2 and replace the TM timer.	
8	Initiate 3 test calls to the circuit under test from the MDF; 2 ten digit calls (1 "match" and 1 "non-match") and 1 three digit call.	All calls should be completed.
9	Repeat Steps 1 and 2 for second Figure 7 circuit.	Same as Steps 1 and 2.
10	Repeat Steps 3 thru 6 for first circuit only.	same as Steps 3 thru 6.

TABLE F (Cont'd)

STEP	OPERATION	OBSERVATION
11	Repeat Steps 7 and 8 for second circuit.	Same as Steps 7 and 8.
12	Repeat Steps 1, 2, 7 and 8 for remaining Figure 7 circuits.	Same as Steps 1, 2, 7 and 8.

5.52 Apply steps in Table G in the order indicated for ESS offices.

5.521 Test ANAC unit using Paragraph 5.4 before applying this test. Table G is only a test of the chain circuit.

TABLE G

STEP	OPERATION	OBSERVATION
1	Remove the timer from its socket.	
2	Block operated the ETH and ETH1 relays.	Relays THR and CT operate. Observe that the MB relay is operated in all other Figure 7 circuits.
3	Perform Steps 3 thru 6 per Table G.	Same as Table G Steps 3 thru 6.
4	Release the ETH and ETH1 relays operated in Step 2 and replace the TM timer.	
5	Perform Step 8 for Table G.	Same as Table G Step 8.
6	Repeat Steps 1, 2 and 3 for the second ESS circuit.	Same as Steps 1, 2 and 3.
7	Repeat Step 3 for first circuit only.	Same as Step 3.
8	Repeat Steps 4 and 5 for second circuit.	Same as Steps 4 and 5.
9	Repeat Steps 1, 2, 4 and 5 for remaining ESS Figure 7 circuits.	Same as Steps 1, 2, 4 and 5.

5.6 System tests - This test can be omitted if Paragraph 5.5 (Multi-ANAC) was used.

5.61 Obtain from the Telephone Company the 3-digit access for the ANAC.

5.62 Arrange with the Telephone Company for the use of three line circuits from which test calls can be made. The numbers (4-digit station numbers) assigned to these line circuits should be such that each bit of the 2-out-of-5 code can be validated for each digit of the number.

Example 1: Three numbers such as XXX-1111, XXX-6666 and XXX-7777; digit 1 validates bits 0 and 1, digit 6 validates bits 2 and 4, and digit 7 validates bits 0 and 7.

Example 2: Three numbers such as XXX-1234, XXX-0579 and XXX-2741.

5.63 Perform the tests per Table H or J (option 10).

NOTE: Prior to performing any system tests, authorization must be obtained from the Telephone Company Representative for those operations that utilize in-service equipment or cause equipment to be temporarily taken out-of-service.

5.64 If trouble is encountered during the performance of the system test check that the cross-connections in the marker, sender, etc. are run properly according to the information supplied by the telephone company. If the test still fails contact the telephone company personnel for advice and assistance. The proper programming of the common control equipment is the responsibility fo the Telphone Company. Adding an ANAC unit is the same as establishing a new trunk route.

TABLE H

STEP	OPERATION	OBSERVATION
1	From a line circuit arranged for test, connect the ITE-4208A Handset to the line circuit at the MDF or DF, and dial the ANAC access code and the station directory number with at least 1 digit dialed incorrectly.	Ringing is heard in the telephone receiver.
2	When the line is answered, request the readout (See Note 1).	An audible readout of the station directory number followed by 120 IPM is obtained via the telephone receiver. Option 8 - The audible readout is repeated.
3	From the second and third line circuits arranged for test, repeat the operations per Steps 1 and 2.	Same as Steps 1 and 2.
4	From a line circuit arranged for test, dial the access code for the ANAC and dial the correct station directory number.	A combination of 60 IPM and high tone is heard in the telephone receiver.
5	Connect the Talking Set to a line circuit that is not assigned for service, dial the access code and the Station directory number.	High Tone is heard in the receiver.
6	YR Option - From a line circuit arranged for test, dial the ANAC access code and the station line directory number with at least one digit dialed incorrectly.	Ringing is heard in the telphone receiver.
7	YR Option - Instruct security attendant not to permit ANAC readout and do not hang up the handset.	In approximately 2.5 minutes all relays will release.

NOTE 1: If the 255A KTU has been connected to the ANAC a readout can be obtained by operating relay SYC.

TABLE J

STEP	OPERATION	OBSERVATION
1	From the line circuit arranged for test, connect the ITE-4208A Handset to the line circuit, at the MDF or DF, and dial the ANAC access code and the security check number set on the B-U switches (dial seven digits).	Ringing is heard in the telephone receiver.
2	If digits set on B-U switches match the number dialed.	An audible readout of the station directory number followed by 120 IPM is obtained via the telephone receiver. Option 8 - The audible readout is repeated.

6. TROUBLE LOCATING PROCEDURES

6.1 Audio Playback Units

6.12 Cognitronics Model 630 - Test and Maintenance instructions for the electro-mechanical APU are provided on the back of the front panel of the Audio Playback Unit.

6.13 Master Specialties Model

6.131 Normal Opertion - The Master Specialties Company Audio Playback Units is considered to be functioning normally if -12V DC (Pin 15 or 16) is applied to any one of the ten inputs (pin 1 thru 10) and the output is a clear audible number (zero thru nine).

6.132 Trouble Shooting - The following three tests are to be utilized to verify the normal operation of the APU. If the APU does not pass all three tests it should be returned to MSC (Master Specialties Company) for repair.

(A) Input Check - When any input is selected the voltage at the input must be -12V DC. When none of the inputs are selected the voltage at the inputs must be approximately 5V DC, otherwise the system is not operating normally.

(B) Sync Pulse Check - The Sync Pulse varies between +12 and -12V DC with 50 msec. duration. This pulse occurs at the end of each digit, approximately 800 msec. between pulses. Any error caused by the sync pulse signal will create a malfunction in the APU.

(C) Output Check - The audio output signal should vary between -6bdm and Odbm when any input to the system is activated. The output level is externally adjusted by the Volume Control Potentiometer, accessed through the hole in the front of the APU.

6.133 Cognitronics Model 640 - The solid-state Cognitronics APU is equipped with an LED which provides a visual indication that the unit is functioning normal. The volume control potentiometer is accessed through the hole in the front of the APU.

NOTE: When this model APU is used a separate battery supply must be furnished; ZV option.

6.2 Table 2 lists troubles which may appear in certain steps of Table A. The possible causes are also listed.

TABLE 2

TROUBLE	ACTION
Any step - Failure of an MF signal (keyed into the ANAC from the ITE-5248) to operate both of its corresponding 2/5 RR- relays.	Check for proper tuning of the 2/5 MF receivers (See HB 59, Section 352) and operation of the 2/5 REC- relays as listed for the various signals.
NOTE: See Note 123 of NSO2503-01 concerning 2 stage (option ZY) amplifier. This option can be used to overcome weak MF signals.	

Signal Keyed From ITE-5248	Operated 2/5 MF Receivers and Relays 0	1	2	4	7
1	X	X			
2	X		X		
3		X	X		
4	X			X	
5		X		X	
6			X	X	
7	X				X
8		X			X
9			X		X
0				X	X
KP			X		
ST					X

TABLE 2 (Cont'd)

TROUBLE		ACTION
Step 1 -	Relay SYC1 (Y option) or AS (Z option) fails to operate.	1. Check the operate path for failure of relays S, P and ON to operate.
Step 4 -	Relays SYC3 and CD fail to operate.	1. Check for relay D to operate and release as the ST key on the ITE-5248 is operated and released. 2. Check for failure of relay TRS to operate and relay END to release.
Step 10 -	Relay AS fails to operate.	1. Check for failure of relay RA to operate and release
Step 12 -	Relay TRA fails to operate.	1. Check for failure of relay END to release. 2. Check for failure of relay D to operate and release when the ST key on ITE-5248 is operated and released.
Step 12 -	Tone fails to be heard.	1. Check for failure of relay TRA to operate.
Step 13 -	The S lamp on the ITE-5248 test set and the combination high on 60 IPM tones fail to extinquish.	1. Check for failure of any relay to release.
Step 16 -	High tone fails to appear and relays ON and SYC3 fail to release.	1. Check for failure of relay NST to operate.
Step 19 -	High tone is heard instead of 120 IPM tone.	1. Check for failure of relay ID2 to operate.
Step 19 -	120 IPM tone is heard and relays ON and SYC3 do not release.	1. Check for failure of relay OFT to operate.
Step 22 -	Relay RAO fails to operate.	1. Check for failure of relay NM to operate and release when the 1 key on the ITE-5248 is operated and released. 2. Check for failure of relay RO to operate.

6.21 Table 3 lists trouble which may appear in the certain steps of Tables B, C and D. The possible causes are also listed.

TABLE 3

TROUBLE		ACTION
Step 11 -	Relay THR1 fails to operate	1. Check for failure of relay KP to operate when the KP key is released.
Step 15 -	Number readout is not heard.	1. Check for failure of relay THR2 to operate when the ST key is released.

Manager, Product Engineering
Control Center

Reason for Reissue
Add test for Security Check Feature.